



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,707	04/13/2004	Dien Nguyen	079173--0117	2912
22428	7590	12/14/2006	EXAMINER	
FOLEY AND LARDNER LLP SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			CHUO, TONY SHENG HSIANG	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 12/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/822,707	Applicant(s) NGUYEN, DIEN	
	Examiner Tony Chuo	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-24,26-29 and 31-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-24,26-29 and 31-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/22/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Claims 1, 4-24, 26-29, and 31-36 are currently pending. Claims 2, 3, 25, and 30 have been cancelled. The objection to the specification is withdrawn. The 112 rejections of claims 1, 24, and 26 are withdrawn. The amended claims 1, 4-6, 13, 16, 24, 26-29, and 31 do overcome the previously stated 102 rejection. However, upon further consideration, claims 1, 4-24, 26-29, and 31-36 are currently rejected under the following 102 and 103 rejections. This action is made FINAL as necessitated by the amendments.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 4-5, 7-11, 13-17, 19-22, 24, 26, 28-29, 32-35 are rejected under 35 U.S.C. 102(e) as being anticipated by Barker et al (US 2005/0155490). Regarding claims 1, 13, and 17, the Barker reference discloses a gas separator plate "14" for a solid oxide fuel cell, comprising: a first and second non-ionically and non-electrically conductive ceramic layers "22" & "24" comprising opposing major surfaces; a plurality of first perforations "28" which extend from the first major surface of the ceramic gas

Art Unit: 1745

separator up to the intermediate layer "26"; a plurality of second perforations "28" which extend from the second major surface of the ceramic gas separator plate up to the intermediate layer "26", wherein the second perforations are offset from the first perforations; a plurality of electrically conductive first plug materials "30" located in the plurality of first perforations, wherein the first plug materials are exposed below, in or over the first major surface of the gas separator plate and the first plug materials are located in electrical contact with the intermediate layer "26"; and a plurality of electrically conductive second plug materials located in the plurality of second perforations, wherein the second plug materials are exposed below, in or over the second major surface of the gas separator plate and the second plug materials are located in electrical contact with the intermediate layer "26" such that each first plug material is electrically connected to a plurality of the second plug materials; and an intermediate layer "26" located inside the ceramic gas separator plate between the first ceramic layer and the second ceramic layer such that the intermediate layer contacts at least one first plug material and at least one second plug material (See paragraphs [0066],[0067],[0069],[0070], and Figure 1).

Regarding claims 4-5, 14-16, and 28-29, it also teaches an intermediate layer that extends substantially parallel to gas separator plate surfaces and electrically connects each of the plurality of first plug materials to each of the plurality of second plug materials (See Figure 1).

Regarding claims 7, 8, 19, and 32, it also teaches a gas separator plate comprising a first major surface and a second major surface separated in the separator

Art Unit: 1745

plate thickness direction; separator plate ceramic layers that are stacked in the separator plate thickness direction; first plug materials that are exposed below, in or over the first major surface of the separator plate; and second plug materials that are exposed below, in or over the second major surface of the separator plate and further comprising gas flow passages located in the first and the second major surfaces of the separator plate (See Figure 1 and paragraph [0053]).

Regarding claims 9-10, 20-21, and 33-34, it also teaches a solid oxide fuel cell stack, comprising: a plurality of gas separator plates "14" and a plurality of solid oxide fuel cells "12" wherein: each solid oxide fuel cell comprises a plate shaped fuel cell comprising a ceramic electrolyte "16", an anode "18" located on a first surface of the electrolyte and a cathode "20" located on a second surface of the electrolyte; each gas separator plate is located between adjacent fuel cells in the stack; each first plug material in each gas separator plate is electrically connected to an adjacent cathode of a first adjacent fuel cell; and each second plug material in each gas separator plate is electrically connected to an adjacent anode of a second adjacent fuel cell, such that each gas separator plate electrically connects an anode of a first fuel cell and a cathode of an adjacent second fuel cell (See Figure 1 and paragraphs [0066]).

Regarding claims 11, 22, and 35, it also teaches the first and second layers of the gas separator plate that are formed of zirconia or yttria-stabilized zirconia to substantially match the CTE of the electrolyte support layer "16" of the fuel cells "12" (See paragraph [0068]).

Regarding claim 24, it also teaches a method of making an gas separator plate for a solid oxide fuel cell, comprising: providing a first and second non-ionically and non-electrically conductive ceramic layers "22" & "24"; forming a plurality of first perforations extending through the first ceramic layer; forming a plurality of second perforations extending through the second ceramic layer; stacking the first ceramic layer and the second ceramic layer to form a ceramic gas separator plate, aligning the ceramic layers such that the first apertures are offset from the second perforations in the stacked layers; forming a plurality of electrically conductive first plug materials in the plurality of first perforations; and forming a plurality of electrically conductive second plug materials in the plurality of second perforations, such that each of the plurality of first plug materials is electrically connected to at least one second plug material; and forming an intermediate layer "26" comprising a continuous layer on at least one of the first ceramic layer and the second ceramic layer prior to laminating the first ceramic layer and the second ceramic layer such that the intermediate layer is located between the first and second ceramic layers after the step of laminating (See paragraph [0072],[0073]).

Regarding claim 26, it also teaches the step of forming the intermediate layer comprises forming the intermediate layer on a surface of the first or the second ceramic layer that is unsintered; the step of laminating the first and the second ceramic layers comprises laminating the first and second ceramic layers that are unsintered after the step of forming the intermediate layer; the step of forming the first perforations comprises forming the first perforations in the first ceramic layer that is unsintered; the step of forming the second perforations comprises forming the second perforations in

Art Unit: 1745

the second ceramic layer that is unsintered; and the steps of forming the first and the second plug materials comprising forming the plug materials such that the intermediate layer contacts at least one first plug material and at least one second plug material to electrically connect at least one first plug material to at least one second plug material (See paragraphs [0072],[0073]).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6, 12, 18, 23, 27, 31, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barker et al (US 2005/0155490) in view of Cable et al (US 2003/0077498). The Barker reference is applied to claims 1, 9-11, 13, 20-22, 24, 26, and 33-35 for reasons stated above. In addition, Barker et al also discloses a gas separator plate comprising a blend of alumina and yttria stabilized zirconia (See paragraph [0068]). However, Barker et al does not expressly teach a third separator plate ceramic layer, wherein the second separator plate ceramic layer is located between the first and the third separator plate ceramic layer; a plurality of third vias extending through the third separator plate ceramic layer but not through the first or second separator plate ceramic layers wherein the third vias are offset from the second vias; a plurality of electrically conductive third fillers located in the plurality of third vias,

Art Unit: 1745

wherein each of the plurality of third fillers is electrically connected to at least one second filler; and a second electrically conductive interconnecting body located between the second separator plate ceramic layer and the third separator plate ceramic layer such that the second interconnecting body contacts at least one second filler and at least one third filler to electrically connect at least one second filler to at least one third filler; a first and second fillers and the interconnecting body comprising materials selected from a group consisting of at least one of the strontium doped lanthanum manganite, strontium doped lanthanum chromite, silver palladium alloys, chromia forming metals, and platinum; and a method comprising: sintering the laminated first and second ceramic layers to form a sintered ceramic gas separator plate, filling the first vias with the first fillers after the step of sintering, and filling the second vias with the second fillers after the step of sintering. The Cable reference discloses a first separator plate ceramic layer consisting of layers "124" & "125", a second separator plate ceramic layer "122", and a third separator plate ceramic layer consisting of layers "126" & "127", wherein the second separator plate ceramic layer is located between the first and the third separator plate ceramic layers; a plurality of third vias "160c" extending through the third separator plate ceramic layer but not through the first or second separator plate ceramic layers, wherein the third vias are offset from the second vias "160a"; a plurality of electrically conductive third fillers located in the plurality of third vias "160c", wherein each of the plurality of third fillers is electrically connected to at least one second filler; and a second conducting layer "134" located between the second separator plate ceramic layer and the third separator plate ceramic layer, such that the second

Art Unit: 1745

conducting layer contacts at least one second filler and at least one third filler to electrically connect at least one second filler to at least one third filler (See Figure 6, Section Y). It also discloses the first and second fillers and the conducting layer selected from the group consisting of platinum, alloys of silver, alloys of palladium, and high chromium alloys (See claim 38). It also discloses co-firing or sintering the laminated first and second ceramic layers to form a sintered ceramic gas separator plate; filling the first vias with the first filler after the step of sintering; and filling the second vias with the second filler after the step of sintering (See paragraph [0076]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Barker gas separator plate to include a third separator plate ceramic layer, wherein the second separator plate ceramic layer is located between the first and the third separator plate ceramic layer; a plurality of third vias extending through the third separator plate ceramic layer but not through the first or second separator plate ceramic layers wherein the third vias are offset from the second vias; a plurality of electrically conductive third fillers located in the plurality of third vias, wherein each of the plurality of third fillers is electrically connected to at least one second filler; and a second electrically conductive interconnecting body located between the second separator plate ceramic layer and the third separator plate ceramic layer such that the second interconnecting body contacts at least one second filler and at least one third filler to electrically connect at least one second filler to at least one third filler; a first and second fillers and the interconnecting body comprising materials selected from a group consisting of at least one of the strontium doped lanthanum

Art Unit: 1745

manganite, strontium doped lanthanum chromite, silver palladium alloys, chromia forming metals, and platinum; and a method comprising: sintering the laminated first and second ceramic layers to form a sintered ceramic gas separator plate, filling the first vias with the first fillers after the step of sintering, and filling the second vias with the second fillers after the step of sintering in order to allow for the provision of discrete passageways to ensure even distribution along the face of the tri-layer, to utilize filler materials that have adequate conductivity and similar coefficient of thermal expansion as the remaining components of the fuel cell, and to ensure the electrically conductive layer remains connected during sintering.

Response to Arguments

5. Applicant's arguments with respect to claims 1-36 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

Art Unit: 1745

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Susy Tsang-Foster can be reached on (571) 272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC


SUSY TSANG-FOSTER
PRIMARY EXAMINER